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3 February 1978

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BIOMEDICAL AND BEHAVIORAL SCIENCES  
No. 86

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3 February 1978

## USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

## BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 86

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. BIOMEDICAL  
Aerospace Medicine

USSR

UDC 611.829:611.1]-08:612.024.47

CHANGES IN THE BLOOD VESSEL BED OF THE SPINAL CORD MENINGES AFTER  
GRAVITATIONAL OVERLOADING IN DIFFERENT DIRECTIONS

Leningrad ARKHIV ANATOMII, GISTOLOGII I EMBRIOLOGII in Russian Vol 72,  
No 10, Oct 77 pp 55-60 manuscript received 4 Nov 76

PORFIR'YEV, M. G., Department of Normal Anatomy, Military Medical Academy  
imeni S. M. Kirov

[Abstract] The changes in the blood vessel bed of the spinal cord meninges after subjecting 48 cats to cranio-caudal or ventro-dorsal gravitational overload were studied using India ink solution in gelatin or collargol vital injection or silver nitrate impregnation and orcein staining. A single 10g overload in the cranio-caudal direction caused the capillary loops to assume a longitudinal direction and varicose enlargement of the venules and small veins, while overload in the ventro-dorsal direction gave arterial and arteriole twisting and capillary widening. The changes decreased on the third day and were absent on the seventh day after the overload. Constriction of the main arteries, disintegration of the smooth muscle bunches, edema and vasocoronal twisting were seen in the pia mater. Repeated overload of 6 g for 3 minutes every other day for a month led to larterial constriction, ligation of vein-satellites, arteriole twisting, venous dilation which persisted for 14 days, increased venules and veins around large lacunae in the dura mater, which were less pronounced after transverse overload. Dilation of portions of the main arteries together with the constriction and twisting and disturbances in smooth muscle and endothelium were found in the pia mater. These changes were more stable than those from a single overload, due to incomplete recovery between overloads. Figures 4; references:111 Russian.

USSR

UDC 591.412:591.415]-08:612.014.47

STATUS OF THE CAT VENTRICULAR MYOCARDIUM MICROCIRCULATORY BED AFTER  
SUBJECTING ITS BODY TO GRAVITATIONAL OVERLOADING

Leningrad ARKHIV ANATOMII, GISTOLOGII I EMBRIOLOGII in Russian Vol 72,  
No 10, Oct 77 pp 44-49 manuscript received 15 Sep 76

MIGUNOV, V. P., Department of Normal Anatomy, Military Medical Academy  
imeni S. M. Kirov, Leningrad

[Abstract] The effects of gravitational overloading on the ventricular myocardium microcirculatory bed of 34 cats were compared to 20 controls, using injection of vessels with an India ink emulsion, section staining with hematoxylin-eosin or orcein, silver nitrate impregnation, Schick reaction and electron microscopy. A single 10 unit overload for three

minutes gave hemorrhages under the epicardium, increased lumen diameter in the intramural arteries, weak twisting and spasm in the arterioles and precapillaries, accumulation of Schick-positive substances, swollen, uneven endothelial cells with variably dense cytoplasm, increased luminal surface folding, local thickening of basal membranes and ribosome and polysome accumulation. On the third day after overload, accumulation of Schick-positive substances and hemorrhages were found, while after 7 days there was no difference between experimental and control animals. Overload of 6 units for 3 minutes repeated daily for a month caused pronounced arterial and arteriole twisting, increased lumen diameter, thickening of the muscular and elastic membranes, accumulation of edematous liquid containing a significant amount of Schick positive substrate, precapillary, arteriole and capillary distention and increased number of capillaries. Electron microscopy revealed edematous cytoplasm and uneven nuclei in capillary cells, disturbed mitochondria and pinocyte vesicles in endothelial cells and narrowed capillaries. The venous portion of the microcirculatory bed was enlarged and twisted. These changes persisted for seven days, and 30 days after the end of the series some twisted or widened arterioles were still seen. The results indicate the great plasticity of the microcirculatory bed and the cumulative and reversible nature of changes caused by gravitational overload. Figures 5; references: 8 Russian.

USSR

UDC 591.436:577.17]-086:591.544

DYNAMICS OF CHANGES IN LIPID CONTENT IN THE LIVERS OF RATS EXPOSED ON THE BIOSATELLITES "COSMOS-605" AND "COSMOS-782"

Leningrad ARKHIV ANATOMII, GISTOLOGII I EMBRIOLOGII in Russian Vol 72, No 10, Oct 77 pp 39-44 manuscript received 7 Feb 77

YAKOVLEVA, V. I., Institute of Medicn-Biological Problems, Ministry of Health USSR, Moscow

[Abstract] The dynamics of lipid accumulation were studied in 11 rats which had flown in the Cosmos-782 satellite for 19.5 days. Six of these were sacrificed 9-11 hours after flight and the rest 25 days after. The results were compared to those from the earlier Cosmos-605 animals, which had been sacrificed 24 and 48 hours or 27 days after flight. Terrestrial model systems used for some control animals imitated all factors of cosmic flight except weightlessness. Three of the 9-11 hour rats had increased plethora of the central liver veins and capillaries and five had increased parenchymal hepatocytes of the central and medial lobes and sometimes the peripheral zones. Lipid infiltration was also found in model controls, but to a lesser extent, with non-uniform distribution and smaller drops. This lipid accumulation was less uniform and marked in the 24 and 48 hour animals. No changes in histology and histochemistry, including oxidative enzyme activity, were found. The accumulation of lipids in the liver is related to lipid mobilization caused by the stress reaction, as confirmed

by increased concentrations of unesterified fatty acids and triglycerides found in the plasma and tissues in the first hours after flight. Figures 4; references 7: 5 Russian, 2 Western.

USSR

UDC 591.81-08:599]-08:591.544

EXPERIMENTS WITH MAMMALIAN CELL CULTURES IN THE COSMOS-782" BIOSATELLITE

Leningrad ARKHIV ANATOMII, GISTOLOGII I EMBRIOLOGII in Russian Vol 72, No 10, Oct 77 pp 28-39 manuscript received 28 Jan 77

SUSHKOV, F. V., RUBNEVA, S. V., NADTOCHEY, G. A., POLIKARPOVA, S. I., and PORTUGALOV, V. V., Institute of Medico-Biological Problems, Ministry of Health USSR, Moscow

[Abstract] In an effort to clarify the functional and metabolic changes in cell cultures found in experiments on the Cosmos-368 and Skylab-3 satellites, L cells and subline 237 line B 11 of the Chinese hamster were studied on the Cosmos-782 satellite. Cultures were thermostated to 29.7° during the 19.5 day flight and timed so that the entire development cycle occurred under weightlessness with lag phase before launch and stationary phase after landing. The cells which had undergone weightlessness were morphologically identical to controls, as were those cultivated from them after flight. Number of viable cells, population density dynamics, ratio of mitotic phases and cell cycle parameters determined by pulse H<sup>3</sup> thymidine labeling were essentially unchanged, while mitotic index was increased 20-40% in the original experimental cells and in the second passage of experimental L cells. In the first passage after flight there was a greater proportion of pathological mitoses with colchicine-like, mono- and acentric or chromosome dispersion, though the total number of pathological mitoses were not statistically different. Chromosome aberrations were not affected, while nuclear size increased in subsequent generations. Electron microscopy showed no changes in cell ultrastructure, except that original experimental cells were less well able to adhere to substrate or glass and had many cells with small cytoplasmic zones. This indirect evidence of accelerated culture aging may indicate that rates of cell propagation differ under weightlessness and gravitation. Figures 5; references 31: 18 Russian, 13 Western.

## Agrotechnology

USSR

### PLENUM OF THE STATE COMMISSION ON CHEMICAL MEANS OF PEST CONTROL, PLANT DISEASES AND WEEDS

Moscow ZASHCHITA RASTENIY in Russian No 9, 1977 pp 52-54

CHENKIN, A. F., candidate of agricultural sciences, Chairman of State Commission on Chemical Means of Pest Control, Plant Diseases and Weeds, Ministry of Agriculture, USSR

[Abstract] The 17th Plenum of the State Commission was held in Yerevan in late May to sum up the work done in 1976 and define the program of testing of pesticides and biological preparations for 1977. The work of the plenum involved the chairmen of the Union and Republic Ministries of Agriculture, Public Health, the Chemical Industry, Civil Aviation, the Medical Industry, the Fishing Industry, the State Planning Commission, the State Forestry Administration, the Agricultural Equipment Industry, the Main Administration for the Microbiological Industry and the National Agricultural Academy. Subjects discussed included measures to decrease the contamination of feeds and animal husbandry products with pesticides; improvement of methods and the organization of testing of preparations; the production of pesticides (1976 level 460,100 tons, including 174,000 tons of herbicides, 69,400 tons of organophosphorus and 42,100 tons of chlorinated hydrocarbon insecticides, 46,000 tons of fungicides, 28,200 tons of seed treatment chemicals) permissible levels of pesticide residues in agricultural products and the maximum permissible concentrations of pesticides for workers working with them; and the creation of highly concentrated, combined preparations for use in agriculture. The chemical industry is criticized for such problems as delivery of chlorophos in the form of a thick, viscous mass, which is difficult to remove from containers, poor quality of manufacture of entobacterin, dendrobacillin and bactorodencide. A list of the compounds permissible for use in agriculture is appended.

USSR

### SYMPOSIA ORGANIZED BY FOREIGN TRADE FIRMS

Moscow ZASHCHITA RASTENIY in Russian No 9, 1977 pp 54-55

UNSIGNED

[Abstract] Descriptions are presented of symposia organized by foreign trade firms in the USSR. These symposia are chiefly designed to familiarize Soviet workers with available pest control preparations. Organizing firms included the Japanese firms Nippon Soda, Nippon Koyaku, Kumiai Chemical, Nissan Chemical, the Dow Chemical Company, the Swiss Sandoz Company and the West German BASF Corporation. Pesticides offered by these firms are briefly described, including their purposes, dosages and relative toxicities.



USSR

WAYS OF INCREASING THE SOYBEAN HARVEST IN THE MOLDAVIAN SSR

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 5, 1977  
pp 82-88

SABEL'NIKOVA, V. I., LUPASHKU, Z. A., VOLOSKOVA, M. M., ARSENYII, A. A.,  
and CHERNOBROVINA, R. M.

[Abstract] Research has been conducted in Moldavia on how to increase soybean production, both in terms of total crop yield and individual plants. Experiments were done from 1971 through 1976 under differing climatic and soil conditions, using Dneprovskaya 12, Byel'tskaya 25, and other plant varieties with different ripening periods. Seeds were treated with nitragin, and some also with molybdenum. Treatment with nitragin proved highly effective. Plant mass increased by approximately 14-49%, and kernels by 25-60%. Plants were taller and sturdier and average weights were considerably above those of the control group, especially the ones treated by a bacteriological (nitrogen-fixing) procedure. Essential amino-acid content was also significantly higher. Nitrogen and protein content were raised. Favorable results were also obtained in studies of soybean content in areas planted two or more times a year; yield, including leafy surface area, was increased after bacteriological treatment with nitragin and molybdenum, and nitrogen, phosphorus, and potassium content were raised. The above may be explained by the absence in some areas of spontaneous types of Rhizobium japonicum, especially true in carbonate chernozem-type soils. In some cases the treatment used increased production by up to 100%. The effectiveness of nitragin depends considerably on the area and type of plant used. Byel'tskaya 25 was most receptive to the 646 bacteriological strain used for nitragination. Such a characteristic should be significant in selecting varieties for cultivation. Figures 2; references: 12 Russian.

## Biochemistry

USSR/USA

### PROBLEM OF THE MOLECULAR CODE OF MEMORY

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3, No 5, Sep/Oct 77 pp 808-820 manuscript received 18 Nov 76

UNGAR, G., University in Tennessee, Memphis, USA

[Abstract] This is a review, by an American author, of contributions (none by Soviet authors) to the study of a molecular basis for memory. The thesis is that the brain possesses a system of chemical coding of information, and that memory operates with the help of this code. Amino-acid composition of memory-associated peptides is presented, and a mechanism of neural transmission of data is suggested. Figures 3; references: 91 Western.

USSR

UDC 577.159

### IMMOBILIZATION OF NAG-VIBRIO NEURAMINIDASE AND CHARACTERIZATION OF ENZYMATIC PROPERTIES

Moscow BIOKHIMIYA in Russian Vol 42, No 10, Oct 77 pp 1736-1740 manuscript received 15 Dec 76

VERTIYEV, YU. V., BELYANSKAYA, G. K. and YEZEPCCHUK, YU. V., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, Academy of Medical Sciences USSR, Moscow

[Abstract] A number of enzymes has been immobilized up to now, among them the "Sigma" produced neuraminidase *Cl. perfringens*, an enzyme with a rather narrow substrate specificity, which does not break the 2-4 bond often found in the glycoproteins. The widest substrate specificity is shown by cholera vibrio neuraminidase. However, so far, this enzyme could not be immobilized. The authors have shown that the NAG-vibrio neuraminidase may be immobilized on cyanogen bromide-activated sepharose 4B, on which the enzyme binds to the carrier through its amino groups. Preservation of the activity shows that with this type of modification, the catalytic center of the enzyme is not affected. Comparison of the properties of free and immobilized neuraminidase showed differences in thermal stability and in activity related to the pH level. The preparation with an activity of 2400 units/ml of sepharose had a high temperature stability. Figures 4; references 18: 3 Russian, 15 Western.

USSR

UDC 577.154

# SYNTHESIS OF IMMOBILIZED TRANSKETOLASE AND SOME OF ITS PROPERTIES

Moscow BIOKHIMIYA in Russian Vol 42, No 10, Oct 77 pp 1872-1877  
manuscript received 28 Feb 77

KOCHETOV, G. A. and SOLOV'YEVA, O. N., Laboratory of Molecular Biology and Bioorganic Chemistry imeni A. N. Belozerskiy, Moscow State University, Moscow

[Abstract] Many studies concerned with immobilized enzymes are aimed at industrial applications in catalytic and analytical chemistry. Among the substrates studied, transketolase may be utilized in determining the concentration of thiamino pyrophosphate, as well as of a series of sugars, and in synthesis of such rare compounds as erythroso-4-phosphate, sedoheptuloso-7-phosphate and others. Preparations of immobilized transketolase were carried out on cyanogen bromide sepharose 4B. A 70% protein binding was observed with 1.25 mg CNBr/ml sepharose activation; at 12.5 mg CNBr/ml--100% binding was observed. The immobilized enzyme retains its activity for 28 and 68 days, respectively, to the above saturation levels. The thermal stability of the immobilized enzyme is also higher than that of the free agent. As a result of the immobilization, the pH optimum of enzymic activity remains almost unchanged; in presence of  $Mg^{2+}$  the alkaline segment of the pH function curve shifts towards the higher alkalinity, while in presence of  $Ca^{2+}$  it is flattened out. That is, the activity of both the acid and base ends of the pH scale is intensified. The apparent Michaelis constant remains the same. Figures 2; references 25: 7 Russian, 18 Western.

USSR

UDC 547.963.32

# CHROMATIN FRACTIONATION ON ACRYLAMIDE GEL WITH IMMOBILIZED NON-HISTONE PROTEINS AND DNA

Moscow BIOKHIMIYA in Russian Vol 42, No 10, Oct 77 pp 1881-1887

KHARCHENKO, YE. P., SHESTAK, K. I. and ASHMARIN, I. P., Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, Academy of Sciences USSR, Leningrad

[Abstract] Fractionation of chromatin on acrylamide gel with immobilized, easily extractable nonhistone chromosomal proteins (RE-NHCP) produced two fractions: one of them was adsorbed by the homologous exogenous RE-NHCP, one was not. The adsorbed fraction showed decreased protein content. Chromatin adsorption is due only to its interaction with immobilized proteins, since in control experiments on pure gel no adsorption was observed. When homologous DNA was chromatographed on RE-NHCP-containing gel, it also produced

adsorbed and non-adsorbed fractions. Finally, when chromatin was passed through a column with immobilized DNA, again the same phenomenon was observed. The data suggest irregular distribution of binding sites, and some restriction towards exogenous homologous and heterogeneous RE-NHCP. Also, the chromosomal proteins, which are components of the chromatin, and which are capable of additional binding with exogenous homologous DNA, are unevenly distributed and limited in number. Figures 4; references 23: 5 Russian, 18 Western.

USSR

UDC 577.21:577.5

#### SPECIFIC ENDONUCLEASE FROM KLEBSIELLA PNEUMONIAE OK8

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 236, No 2, 1977 pp 477-478 manuscript received 14 Jun 77

KUZ'MIN, N. P., FODOR, I. and BAYEV, A. A., Institute of Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR, Pushchino, Moscow Oblast

[Abstract] Data are presented on the separation and purification of a specific endonuclease from *klebsiella pneumoniae* OK8 (Kpn I), as well as mapping of Kpn I sites on the DNA of the lambda bacteriophage and the SV 40 virus. The restriction endonuclease Kpn I has 2 restriction sites on the DNA of the lambda phage and 1 site on the DNA of the SV 40 virus. The presence of the sticky ends allows restriction endonuclease Kpn I to be used to produce recombinant DNA molecules in vitro. The strain of *klebsiella pneumoniae* OK8 was obtained from the laboratory of G. Boyer of San Francisco. Two sites of restriction of Kpn I are located on the DNA of the lambda phage. The left Kpn I site is located in the region of the late J gene responsible for the synthesis of the fibrils of the tail section of the phage. Current studies are underway to determine whether it is inside or outside the gene. The Kpn I site on the SV 40 virus is located at the boundary between the early and late genes. Kpn I fragments can be cloned in a bacterial system if the vector molecule of DNA of the lambda phage or plasmid is present. This work is currently underway. Figures 4; references: 8 Western.

USSR

UDC 547.963.32

ISOLATION AND DESCRIPTION OF PREPARATIONS OF DNA FROM CELLS OF CERTAIN STRAINS OF THE YEASTS CANDIDA AND RHODOTORULA

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 644-649 manuscript received 25 Jan 77

GRIGOR'YEVA, S. P. and SHCHEKINA, Ye. V., All-Union Scientific Research Institute for Biosynthesis of Protein Substances, Moscow

[Abstract] A study was made of certain strains of yeasts of the genera *Candida* and *Rhodotorula* with the purpose of isolation of preparations of native total DNA suitable for genetic work. DNA preparations were separated from *C. tropicalis*, *C. lipolytica*, *C. guilliermondii*, and *R. minuta*. The yeast cells were broken down by a preparation based on the digestive juices of helix pomatia or pectinase. The DNA was purified on hydroxyapatite by a column method. Data are presented on the purity and nucleotide composition of the DNA preparations isolated. Figures 2; references 11: 6 Russian, 5 Western.

USSR

UDC 547.155.2

ISOLATION AND CHARACTERISTICS OF INTRACELLULAR RIBONUCLEASE  $Pc_1$  and  $Pc_2$  OF THE FUNGUS *PENICILLIUM CLAVIFORME*

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 637-643 manuscript received 2 Nov 76

IVANOVA, G. S., YANGOL', L. M. and BEZBORODOV, A. M., Institute of Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR, Pushchino

[Abstract] This work is dedicated to the isolation and study of the properties of the primary component, arbitrarily called RNAase  $Pc_1$ , and one minor component ( $Pc_2$ ) of the intracellular RNAase of *pen. claviforme*. The methods of gel filtration and ion-exchange chromatography are used to isolate and purify the two components to the homogeneous state. The enzymes manifest their greatest activity at pH 6.0-6.5 at 40 C. The RNAases isolated are proteins with isoelectric point at pH 4.7 ( $Pc_2$ ) and 5.0 ( $Pc_1$ ) and molecular weight 34,000-38,000. The enzymes completely lyse various types of RNA when no metal ions are present, though the ions  $Cu^{2+}$  and  $Zn^{2+}$  are strong inhibitors. According to electrophoretic data in polyacrylamide gel,  $Pc_1$  has the same electrophoretic mobility as the extracellular RNAase II. Figures 2; references 16: 5 Russian, 11 Western.

USSR

UDC 577.150.7

ISOLATION OF A PREPARATION OF GLYCEROL DEHYDROGENASE FROM ACETOBACTER SUBOXYDANS AND ITS DESCRIPTION

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 654-658 manuscript received 24 Mar 77

OVERCHENKO, M. B., SKOROKHOVA, V. A., DOBROLINSKAYA, G. M. and V. L. YAROVENKO, All-Union Scientific Research Institute for Fermentation Products, Moscow; All-Union Scientific Research Institute for Synthetic and Natural Aromatic Substances, Moscow

[Abstract] Glycerol dehydrogenase from *A. suboxydans* has not yet been described. The purpose of this work was to isolate this intracellular enzyme preparation and study its properties. NAD-dependent glycerol dehydrogenase, catalyzing the oxidation of glycerine in dioxycetone, was isolated from the cells of *acetobacter suboxydans*. The influence of pH on activity and stability of this enzyme was studied. It was established that there are two glycerol dehydrogenases in the enzyme preparation: one is active at pH 6.0-7.0, the other at pH 10.0. The resistance of glycerol dehydrogenase to the influence of elevated temperatures was studied. Enzyme solutions at pH 6.5 were found to be less thermally stable than enzyme solutions in  $\text{NaHCO}_3\text{-Na}_2\text{CO}_3$  buffer solution with pH 10.0, which can withstand heating to 90 and 100 °C for 1 hour while retaining 30 and 20% of their activity, respectively. Incubation of this solution at 40 °C for 4 hours results in a loss of only 15% of the activity. The preparation thus manifests its activity over a broad pH range, the maximum activity being observed at pH 10.0. Figures 3; references 13: 5 Russian, 8 Western.

USSR

UDC 577.156.3

STUDY OF CERTAIN PHYSICAL-CHEMICAL AND ENZYMATIC PROPERTIES OF POLYMER DERIVATIVES OF TRYPSIN BASED ON DEXTRAN

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 685-691 manuscript received 20 Dec 76

LINDENBAUM, G. M., BOGACHEVA, T. I., MIRGORODSKAYA, O. A., MOSKVICHEV, B. V. and TERESHIN, I. M., All-Union Scientific Research and Technological Institute for Antibiotics and Enzymes for Medical Applications, Leningrad

[Abstract] This work studies the influence of chemical modification of trypsin by dextran on the properties of the enzyme. The molecular weight distribution, thermal stability under conditions of autolysis and resistance to the effect of human blood serum inhibitors, as well as the temperature optimum of native trypsin and the enzyme are modified by water-soluble dextran. The work utilized crystalline trypsin produced in the

CSSR and a dextran fraction with mean molecular mass  $55,000 \pm 10,000$ . The apparent autolytic inactivation and inhibition constants of the native and modified forms of trypsin were calculated. It is shown that the polymer derivatives of trypsin have higher values of molecular mass than the native enzyme, and also higher resistance to autolysis and the effect of blood serum inhibitors. In addition to the steric factor, the interaction of trypsin and the blood inhibitor is influenced by the electrochemical nature of the polymer matrix. In the case of a negatively charged matrix, for example, a bisulfite matrix, electrostatic repulsion of the matrix and the negatively charged blood serum inhibitor occurs, further increasing the inhibition constant. Figures 5; references 12: 6 Russian, 6 Western.

USSR

UDC 557.152.36

#### STUDY OF THE ACTIVATION OF AMYLORIZINE G10x BY SILICA GEL

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 692-694 manuscript received 4 Aug 76

ABDUMALIKOV, A. KH., KHASANOV, KH. T., MAD'YAROV, SH. R. and RAKHIMOV, M.M., Central Asian Scientific Research and Planning-Design Institute for the Food Industry, Tashkent

[Abstract] A study is made of the activation of the enzyme preparation amylorizine G10x by silica gel and the reaction of hydrolysis of starch. Commercially produced amylorizine G10x was used. The amylolytic activity was determined by the standard method, using as the unit of activity that quantity of the enzyme which catalyzed hydrolysis of 10 ml of 1% solution in 10 minutss at 30 C so that the degree of transformation of the substrate was 30%. The silica gel injected into the medium in which the starch hydrolysis reaction occurred significantly increased the specific activity of this preparation, shifting the pH optimum into the acid zone, increasing the temperature optimum and increasing thermal stability. Data are presented showing the possibility of using adsorbed amylorizine G10x in a continuous reactor. Figures 5; references 10: 3 Russian, 7 Western.

USSR

UDC 581.17

ISOLATION OF PROTOPLASTS FROM THE LEAVES OF VICIA FABA BY MEANS OF THE ENZYME PREPARATION "CELLOCANDINE"

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 766-768 manuscript received 20 Jan 77

KRYUKOVA, L. M., MEDVEDKOVA, V. V., MAYEVSKAYA, YE. V., RODIONOVA, N. A., and TIUNOVA, N. A., Institute of Biological Physics, Academy of Sciences USSR; A. N. Bakh Institute of Biochemistry, Academy of Sciences USSR

[Abstract] A study is made of the possibility of using the enzyme preparation "cellocandine" for separation of protoplasts from the leaves of vicia faba, formerly performed using cellulase and hemicellulase as well as "xylanase" obtained from an extract of a surface culture of aspergillus niger. Cellocandine G3x and G10x is cellulase from the mold fungus geotrichum candidum. It is shown that the isolation of native protoplasts by means of a 2% enzyme cellocandine G10x preparation can be performed with minimum incubation time (60 minutes) at 26-28 °C. Using this method, more than 3 million protoplasts per ml, or 90% of the viable protoplasts, were isolated. Figure 1; references 5: 4 Russian, 1 Western.

USSR

UDC 577.154.3

STUDY OF THE SORPTION OF  $\alpha$ -AMYLASE BY KMT TYPE CARBOXYL CATIONITE

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 721-724 manuscript received 29 Mar 77

KISELEVA, YE. M., MIRGORODSKAYA, O. A., MOSKVICHEV, B. V., MOMOT, N. N. and SAMSONOV, G. V., All-Union Scientific Research and Technological Institute for Antibiotics and Enzymes for Medical Applications, Leningrad

[Abstract] This work studies the conditions of interaction of  $\alpha$ -amylase from bacillus subtilis with type KMT carboxyl cationite. The influence of pH and calcium ions on the process of sorption and desorption of the  $\alpha$ -amylase was studied. The optimum pH for sorption of the enzyme was found to be 4.6-5.0. It is shown that desorption of the active protein is 100% of the quantity applied. The sorption capacity for protein is 160 mg/g KMT, the activity is 12,000 AE/g. The work utilized amylosubtilin G10x with an amylolytic activity of 43,000 AE/g protein content about 10% by weight. KMT is a strongly swelling cationite produced by copolymerization of methacrylic acid and 1, 3, 5-triacryliltriazine. Ion-exchange chromatography of  $\alpha$ -amylase on granulated KMT under dynamic conditions yielded the value of 12,000 AE/g and showed that the specific activity in the eluate in comparison with the specific activity of the initial preparation was increased by a factor of about 2.5. Figures 3; references 5: 3 Russian, 2 Western.



USSR

UDC 577.154.35

#### MULTICOMPONENT NATURE OF PECTOLYTIC ENZYMES IN PREPARATIONS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5, Sep/Oct 77 pp 666-672 manuscript received 2 Mar 77

YUDIN, YE. V., TURKINA, T. I. and RODZEVICH, V. I., All-Union Scientific Research Institute for Fermentation Products, Moscow

[Abstract] An attempt is made to study the possibility of isolation of pectolytic enzymes by the method of gel filtration in preparations produced from the fungi *asp. awamori* and *asp. foetidus*. A study of the polygalacturonase and pectinesterase in pectolytic preparations from *A. awamori* and *A. foetidus* by gel filtration on sephadex G-50 (medium) showed that these enzymes have multiple components. Gel filtration succeeded in separating polygalacturonase from pectinesterase, and also in producing fractions containing only exopolygalacturonase. Chromatography on cellulose showed that the pectolytic preparations contain at least 2-4 types of polygalacturonase and pectinesterase. The fact that polygalacturonase and pectinesterase consist of several types is established beyond doubt. The method of gel filtration is best used only in the first stages of purification, with ion-exchange chromatography being used in the subsequent stage for detailed description and determination of individual forms of the pectolytic enzymes. Figures 4; references 15: 8 Russian, 7 Western.

USSR

UDC 543.866:541.128

#### THERMAL STABILITY OF ENZYMES COUPLED TO ALBUMIN

Vilnius TRUDY AKADEMII NAUK LITOVSKOY SSR in Russian No 3, 1977 pp 135-139 manuscript received 17 May 76

KULIS, YU. YU., AKULOVA, V. F. and KURTINAYTENE, B. S., Institute of Biochemistry, Academy of Sciences Lithuanian SSR

[Abstract] In an investigation of the thermal stability of enzymes coupled to albumin, it is shown that glucose oxidase and trypsin were coupled to albumin by means of glutaric aldehyde. The relationship of the relative activity of the preparations to the enzyme concentration was studied, and it was established that the principal cause of decrease in the relative activity of the preparation were difficulties in diffusion. Coupling of the enzymes with albumin brings about a decrease in the thermal stability of the immobilized enzymes at 56°C and of the dry preparations at 100°C. Figures 3; references 9: 4 Russian, 5 Western.

## APPLICATION OF THE POLYAMIDE CAPRON AS A CARRIER FOR THE IMMOBILIZATION OF ALPHA-CHYMOTRYPSIN

Vilnius TRUDY AKADEMII NAUK LITOVSKOY SSR in Russian No 3, 1977  
pp 129-134 manuscript received 17 Mar 76

DAGENE, M. I., SALYUGINAYTE, Z. I. and PAULYUKONIS, A. B., Institute of Biochemistry, Academy of Sciences Lithuanian SSR

[Abstract] In experiments conducted on the application of natural and modified flocculated polyamide capron for the immobilization of chymotrypsin, it was found that the addition of chymotrypsin to flocculent capron may result in an immobilized and stabilized enzyme preparation. Capron possesses a low capacity as an enzyme immobilization carrier, and attempts to increase the capacity via chemical modification were unsuccessful. Figures 5; tables 1; references 22: 4 Russian, 18 Western.

USSR

UDC 616.988.73

PSITTACOSIS CASES IN THE CITY OF IZHEVSK

Kazan' KAZANSKIY MEDITSINSKIY ZHURNAL in Russian Vol 58, No 4, Jul/Aug 77  
pp 62-64 manuscript received 27 Apr 76

KUSTARNIKOV, G. K., KAMALETDINOVA, Z. V., NOVOKSHONOVA, G. I., PIMENOV,  
L. T. and GORLOV, V. T., Department of Infectious Diseases, Izhevsk Medical  
Institute

[Abstract] Five cases of psittacosis are reported in one family in the city of Izhevsk. The family kept about 70 parrots which became infected by the introduction of three diseased birds. The disease was characterized by temperatures of 38-40°, head and chest pain, insomnia, cough with scanty mucus production, weakness, chills, rheumatic pain, loss of appetite and vomiting in two patients. Strong rattles and percussive sounds accompanied changes in the lungs and the liver was palpable. Complex therapy including tetracycline normalized temperature, sleep and appetite, but adynamia remained for 5-6 weeks. Leucopenia, increased leucocyte sedimentation rate and proteinurea were seen. Presence of serum antibodies to ornithosis at titers of 1:8 and 1:16 confirmed diagnosis. No references.

USSR

UDC 616.981.42-022.39-07:616.15-097.5-078.7

STUDY OF INCOMPLETE ANTIBODIES AMONG THE POPULATION OF VARIOUS AGE GROUPS  
IN CATTLE BRUCELLOSIS FOCI IN THE KASHKADAR'INSKAYA OBLAST

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII in Russian No 8,  
Aug 77 pp 59-62 manuscript received 20 Apr 76

SUKHARENKO, S. N., VAFAKULOV, B. KH., TYNCHEROVA, F. M., KAYBULLAYEVA, L.R.,  
MUSTAFAYEV, KH. M. and ALIMARDANOV, KH. A., Kashkadar'inskaya Oblast  
Sanitary-Epidemiological Station

[Abstract] In a study of the Coombs agglutination test in cruceellosis diagnosis, extensive claims are made that the Coombs reaction is highly specific and exceeds severalfold the agglutination reaction, but the Coombs reaction among various age groups of the population requires study. It has been found that the population of the Kashkadar'inskaya Oblast, residing in cattle brucellosis foci, reacts more frequently to the presence of incomplete antibodies in the blood serum (46.6%) than to the presence of agglutinins, determined by the Wright reaction (2.6%). A positive Coombs reaction was registered with equal frequency among the juvenile population and among persons of the senior age groups. Thus, children 7-10 years of age reacted positively to brucellosis in 40.3% of the tests, in the 11-14 year-old group the positive reaction occurred in 45.6% of the tests, and among the adult population (31-40 years old) the positive

reaction was 32.3%. At the same time, persons with extremely high Coombs-reaction titers (1:6400-1:12800) were, as a rule, virtually in a good state of health. References 11: 5 Russian, 2 Czech, 4 Western.

USSR

UDC 616.927-036.22-022.35(6)

SOME EPIDEMIOLOGICAL PECULIARITIES OF WATER-BORNE OUTBREAKS OF TYPHOID FEVER IN NORTH AFRICA

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII in Russian  
No 8, Aug 77 pp 45-50 manuscript received 28 Jun 76

SPOTARENKO, S. S. and SPOTARENKO, R. V., Central Institute of Epidemiology,  
Moscow Oblast Sanitary and Epidemiological Station, Moscow

[Abstract] On the basis of analysis of several water-borne outbreaks of typhoid fever in North Africa it is concluded that the true dynamics of morbidity can be ascertained only on the basis of an analysis of the incidence periods. In spite of the fact that the group of hospitalized patients in the period of outbreaks in some territories is assembled on a selective basis, it is representative for ascertaining the nature of the morbidity dynamics. With the late and incomplete hospitalization of patients during the period of water-borne outbreaks of typhoid fever, consideration should be given, during analysis, to the possibility of the appearance of subsequent illnesses, in the foci, that are not tied to the factor causing the origination of these foci. Figures 3; references: 7 Western.

BEHAVIOR OF SOME FISHES WHEN HUNTING

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 9, Sep 77 pp 1328-1339

KASHIN, S. M., MALININ, L. K., ORLOVSKIY, G. N. and PODDUBNYY, A. G.,  
Institute of Oceanology, Academy of Sciences USSR (Moscow); Institute  
of the Biology of Inland Waters, Academy of Sciences USSR (Borok,  
Yaroslavskaya Oblast); Moscow State University.

[Abstract] The sequence of the actions of fresh-water predatory fishes (*Aspius aspius*, the pike [*Esox lucius*] and the perch [*Perca fluviatilis*]) is described on the basis of cinematic recording during hunting for young fish as prey. The selected fish species differ much with respect to ecology; *Aspius aspius* actively pursues the prey during the hunt, whereas the pike hunts in different ways, awaiting on the lookout or overtaking the prey. The perch apparently occupies an intermediate position. The behavior of the fishes was investigated during hunting in the daytime, when the leading receptor system is vision. These differences are explained by the way of life, as well as by features in the structure of the motive system of each of the species. Data indicate the possibility that *Aspius aspius* possesses an extrapolative reflex. Figures 8; references 6: 5 Russian, 1 Western.

USSR

UDC 616.953-085.371-092.6-036.8

STUDY OF IMMUNOLOGICAL EFFICACY OF THE ENTERAL VACCINATION OF VOLUNTEERS WITH DETERGENT SONNE DYSENTERY MONOVACCINE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII in Russian No 8, Aug 77 pp 26-31 manuscript received 2 Aug 76

SHPILYUK, G. F., GENNAD'YEVA, T. YA., KHAZENSON, L. B., KAMBAROVA, O. I., and SEL'KINA, L. YE., Leningrad Scientific Research Institute of Vaccines and Sera; Leningrad Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur

[Abstract] The enteral and subcutaneous administration of detergent Sonne dysentery monovaccine brings about a specific immune response reaction--the accumulation of specific antibodies in the blood serum and the mucus evoked by means of the conventional and modified indirect hemagglutination reaction. Enteral immunization by this vaccine stimulates the accumulation predominantly of class IgA secretory antibodies, whereas subcutaneous immunization stimulates the accumulation of class IgG serum antibodies. It may be assumed that the immunological effect of enteral vaccination is linked to some transformations, in the intestine, of the antigen which thereafter acquires the capability of stimulating the synthesis of antibodies in other secretory zones or may bring about the settlement of IgA-producer cells to extraintestinal lymphoid tissues. References 17: 7 Russian, 1 Hungarian, 9 Western.

USSR

UDC 615.371:576.851].014.41

SURVIVAL OF EB MICROBES IN LIVE NIIS PLAGUE VACCINE AND ITS IMMUNOGENICITY DURING PROLONGED STORAGE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII in Russian No 8, Aug 77 pp 139-140 manuscript received 31 Dec 76

CHICHERIN, YU. V., LEBEDINSKIY, V. A. and YEVSTIGNEYEV, V. T.

[Abstract] A study of the survival of live NIIS plague vaccine, in the process of its prolonged storage under warm (37, 18-24, and 2-5°C) and cold (-20°C) conditions, is conducted. The NIIS vaccine constitutes a sublimation-dried culture of strain EB, obtained by the depth method of incubation. The vaccine contains no admixtures with the exception of the drying medium, and may therefore be employed cutaneously and subcutaneously, as well as by inhalation. Test characterizing the survival of microbes of the EB strain in live NIIS plague vaccine and its immunogenicity during prolonged storage, under the conditions noted above, indicates that the NIIS live dry plague vaccine is a preparation with high immunogenicity and high stability during storage within a comparatively broad temperature range.

USSR

UDC 615.37.012.6.014.45

PRINCIPLES OF OPTIMIZATION AND SCALING OF CERTAIN PROCESSES IN THE TECHNOLOGY OF VACCINE PRODUCTION. REPORT I. SOME PROBLEMS OF SCALING AND OPTIMIZATION DURING THERMAL STERILIZATION OF LIQUIDS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 10, Oct 77 pp 33-37 manuscript received 5 Jan 77

MATVEYEV, V. YE., TARASENKO, V. M. and BOROD'YEV, A. A.

[Abstract] A study is made of certain basic problems, the solution of which will allow a significant increase in the degree of standardization of the conditions of sterilization of fluids and, consequently, standardization of the composition of sterile fluids. At present, the end result of sterilization is defined by many different factors, simultaneous consideration of the influence of which is not presently possible. It is recommended that the criterion of aseptic effectiveness be used to scale processes of inactivation of secondary microflora in thermally sterilized liquids. Optimization of processes of thermal sterilization of liquids should be based on combined analysis of the kinetics of death of secondary microorganisms and the kinetics of decomposition of substances which determine the biologic and technological effectiveness of the fluids. References 9: 2 Russian, 7 Western.

USSR

UDC 576.851.555.083.3

BIOLOGICAL-ECONOMIC STUDY OF THE PROCESSES OF CULTIVATION OF CLOSTRIDIUM PERFRINGENS. REPORT II. COMPARISON OF THE EFFECTIVENESS OF ACTUAL AND PREDICTED PROCESSES OF CULTIVATION OF THE MICROORGANISMS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 10, Oct 77 pp 37-42 manuscript received 27 Jan 77

ZAPOROZHTSEV, L. N., BASNAK'YAN, I. A., IL'NITSKAYA, YE. A., VLASENKO, A. P., ARTEM'YEVA, T. A. and GRUNTOVICH, V. S., Moscow Scientific Research Institute for Vaccines and Serums imeni Mechnikov

[Abstract] This work presents a comparative study of the effectiveness and phase-portrait predictions of the cultivation of *Cl. perfringens* type A. The effectiveness criterion I was used, representing the number of activity units of the toxin  $L^+$  which can be produced in one hour. It is calculated as the product of the rate of dilution  $D$ , operating volume of the fermentor  $V$  and activity of the toxin  $P$ . The results of a comparative study of actual shop costs of producing the annual quantity of *Cl. perfringens* type A toxin using various methods of cultivation indicated that the semicontinuous and combined multicyclic processes produced the lowest

costs. The multicyclic combined process is optimal on the basis of effectiveness, shop cost and labor expenditures. Figures 2; tables 4; references 5: 4 Russian, 1 Western.

USSR

UDC 617-001.17-06:616.94-022.7 (Staphylococcus)]-07:  
[616-056.3-022.7+616.155.3-008.13

RELATIONSHIP BETWEEN STAPHYLOCOCCUS SENSITIZATION, PROTECTIVE FUNCTION OF THE LEUKOCYTES AND SEPTIC COMPLICATIONS IN BURN PATIENTS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 10, Oct 77 pp 54-58 manuscript received 24 Jan 77

MATUSIS, Z. YE., PYLAYEVA, S. I. and GUSEVA, M. P., Gor'kiy Scientific Research Institute for Traumatology and Orthopedics

[Abstract] A study is made of staphylococcus sensitization in burn patients, with simultaneous evaluation of the protective function of the patient's own leukocytes in relationship to autostrains and standard strains of staphylococcus, as well as the clinical peculiarities of the disease. Clinical and laboratory studies of 42 patients with severe burns and various manifestations of staphylococcus infection were undertaken. The staphylococcus phagocytosis completeness index was determined in all patients (389 studies), and, in 25 microbe sensitization tests were also performed (105 studies). It was found that in severe burn cases in patients with various manifestations of staphylococcus infection, clear sensitization to the allergen of hemolytic staphylococcus develops, the damage to the neutrophils by the staphylococcus allergen being particularly great with generalized forms of infection. Sensitization is retained for long periods of time in severe burn cases--positive test results being observed after complete clinical recovery. Sensitization of the body of burn patients to staphylococcus is accompanied by disorders of intracellular destruction of staphylococcus by leukocytes from the blood of the patients, i.e., there is a close feedback mechanism. Generalized forms of staphylococcus infection with severe burns are characterized by a combination of high staphylococcus allergy indicators and low staphylococcus phagocytosis completeness index, particularly for autostrains, which can be used as a diagnostic and prognostic indicator. References 23: 20 Russian, 3 Western.



USSR

UDC 576.809.55+577.154.35

BASIC CRITERIA FOR SELECTION OF ACTIVE STRAINS OF CLOSTRIDIUM FELSINEUM,  
SUITABLE FOR THE PRODUCTION OF PECTOLYTINE

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13, No 5,  
Sep/Oct 77 pp 704-708 manuscript received 16 Dec 76

AVROVA, N. P., All-Union Scientific Research Institute for Agricultural  
Microbiology, Leningrad

[Abstract] The purpose of this work was the selection of criteria for selection of active strains of *Cl. felsineum* suitable for the production of the preparation pectolytine. In this process, it is necessary to consider the following factors: the cultural-morphologic variability of *Cl. felsineum*, arising upon cultivation on nutrient media, technological properties and activity of pectolytic enzymes. The version thus selected, which produce spores intensively, maintaining this intensity upon transplantation to a production medium and having an active complex of pectolytic enzymes, can be used for preparation of pectolytine. Selection of a culture must be begun with selection of a colony which is convex, circular, with smooth borders, orange with a center spot growing into the auger, 2-4 mm in diameter. Cultures from selected colonies must be capable of intensive spore formation as described above. The cultures thus selected must retain all their properties when grown in fermentors. Tables 3; references 8: 7 Russian, 1 Western.

Industrial Toxicology

USSR

UDC 613.63:547.53)-074:543.544

GAS CHROMATOGRAPHIC ASSAY OF DIMETHYLTERAPHTHALATE, DINYL, METHYLTOLUYLATE AND p-XYLENE IN THE AIR DURING PRODUCTION OF POLYESTER FIBERS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 54-56 manuscript received 5 Jul 76

PERTSOVSKIY, A. L. and DYU'KO, A. N., Sanitary Hygiene Institute, Minsk

[Abstract] Laysan fiber production involves work site contamination with the subject compounds. A modified gas chromatography method has been used to determine their content in factory air. The liquid phases used included polyethylene glycol 6000, polyethylene glycol 20 M, neopentylglycol succinate, lucooyl MF (methylphenylsiloxane oil) and synthetic caoutchouc SKTPhT-50-Kh; solid carriers, diatomite brick INZ-600, chromosorb R and silanized chromaton. The chromatographs used were the "Byruchrom" and "Tswett-5". Procedures are described; quantitative analysis was by absolute calibration based on height of curves. A typical chromatogram is displayed. Figure 1; references 7: 6 Russian, 1 Czech.

USSR

UDC 615.916'145.015.45:612.112.94

EVALUATION OF T-LYMPHOCYTE POPULATIONS IN HUMANS EXPOSED TO ACTION OF BERYLLIUM COMPOUNDS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 52-54 manuscript received 7 May 76

YERMAKOVA, N. G., Institute of Labor Hygiene and Occupational Diseases, Academy of Medical Sciences USSR, Moscow

[Abstract] Earlier studies in vitro on beryllosis and cellular immunity, and knowledge of the role of T-cells in development of cellular immunity suggested usefulness of a quantitative determination of T-cell populations in beryllosis. Assay was based on the test for spontaneous rosette formation in beryllosis patients and in healthy workers who come in contact with Be compounds (Jondal, modified by M. A. Stenina) and on the leucocyte migration inhibition reaction (Soborg and Bendixen). A large range of changes were revealed in population size and in adhesion qualities of T-lymphocytes in the patients and in those exposed to Be. The test for spontaneous rosette formation was found to be sufficiently indicative for use in study of beryllosis pathogenesis and to correlate with the state of activity of the disease. Figure 1; references 16: 6 Russian, 10 Western.

USSR UDC 613.632:615.355:577.152.123'133).012+615.917:577.152.123'138

COMPARATIVE CHARACTERIZATION OF TOXICITY, HAZARDS AND NATURE OF THE HARMFUL ACTION ON THE BODY OF SOME INTERMEDIATES IN SYNTHESIS OF LIPOIC ACID

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 39-42 manuscript received 23 Jul 76

RODIONOVA, R. P., IVANOV, N. G., ROZOVA, T. A. and ZUYEV, A. N., Institute of Labor Hygiene and Occupational Diseases, Academy of Medical Sciences USSR, Moscow

[Abstract] Soviet sanitary physicians are concerned in study of raw materials and intermediates of synthesis of vitamin products. Some of these chemicals, involved in synthesis of lipoic acid are monoethylester of adipic acid, its chloroanhydride, ethyl ester of 6-keto-8-chlorooctanoic acid, ethyl ester of 6,8-dichlorooctanoic acid, and ethyl ester of 6-hydroxy-8-chlorooctanoic acid. Chemistry and toxicities of these compounds were studied; mice, rabbits, rats and guinea pigs were used as experimental animals. Maximum permissible levels (MPL) were suggested: for the monoethylester, 3 mg/m<sup>3</sup>, for the chloroalcohol and dichloride, 5 mg/m<sup>3</sup>, for the chloroanhydride, 2 mg/m<sup>3</sup>, and for chloroketone 1 mg/m<sup>3</sup>. References 4: 3 Russian, 1 Western.

USSR

UDC 613.6:669.3.046.5

PHYSIOLOGICAL AND HYGIENIC CHARACTERIZATION OF LABOR CONDITIONS OF EQUIPMENT OPERATORS IN COPPER SMELTING WORKS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 43-45 manuscript received 27 May 76

AKHMETOV, D. A. and AMANGEL'DIN, S. K., Kazakh Institute of Labor Hygiene and Occupational Diseases, Karaganda

[Abstract] The equipment used by the electrolytic shop operators includes heat exchangers, mixers, flotation machines, filter presses, rotary driers and roasters, crystallization tanks, centrifuges and pumps; jobs include washing slurries from baths, charging and discharging of products and the like, requiring monitoring and regulating of devices. The workers examined were at the Dzhezkazgan Ore Mining and Smelting Combine, twenty-six men and 22 women, on the job 3 to 8 yrs, ages 24 to 39. Studied were body and skin temperature, perspiration, pulse (EKG), blood pressure, respiration, expenditure of energy, latent period of reflex action to light and sound, speed of perception and processing of information. Maximum permissible levels (MPL) of harmful agents in the environment were maintained at or below the MPL code. Appropriate measures for maintenance of

healthy working conditions for meeting physical and mental stresses, and establishment of work regimes (including work breaks) are indicated. A bread kvas drink, easily prepared under the semi-arid conditions, is recommended to replace sweat losses of vitamins, salt and liquids. References: 6 Russian.

USSR

UDC 613.632.4:547.595.2):613.155.3

SUBSTANTIATION OF MAXIMUM PERMISSIBLE CONCENTRATION OF CHROMINE IN THE ATMOSPHERE OF A WORK AREA

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 35-39 manuscript received 18 Jan 77

NIKITENKO, T. K. and PAVLOVSKAYA, G. S., Institute of Labor Hygiene and Occupational Diseases, Academy of Medical Sciences USSR, Moscow

[Abstract] Chromine is perfluoroethylcyclohexanesulfoxyate, a surface-active compound used in chromium electroplating. Data of studies to establish a maximum permissible level (MPL) of it in the factory air are presented. Methods used followed directions in "Temporary methodological directions to establish the MPL of toxic substances in the atmosphere of a working area". The physical chemical properties of the chromine, e.g., size of its dust particles, are presented. Effects of inhalation by animals of the dust, 250-1500 mg/m<sup>3</sup>, on the CNS, on heart rhythm, on spontaneous movement, on nasal exudate, after application on skin, and on the eye are presented. Chromine action is cumulative. The MPL is set at 5 mg/m<sup>3</sup>. The compound is described as moderately toxic, of Class III harmfulness. References: 3 Russian.

USSR

UDC 614.77:614.774:(615.285.7+631.8

TOXICOLOGICAL AND CHEMICAL STUDY OF VOLATILE COMPOUNDS WHICH FORM IN SOIL CONTAINING POLYCHLOROPINEN AND MINERAL FERTILIZERS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 32-35 manuscript received 7 Dec 76

KLISENKO, M. A., VOYTENKO, G. A. and KISELEVA, N. I., Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] Polychloropinen (PCP) and various fertilizers have been employed on sugar beet acreage in the Ukraine from 1969-1975. The present study examines the promoting effect of UV and temperature on the formation of volatile toxic substances in the soil containing those additives. The products formed are identified and their toxicity evaluated. UV radiation of soil samples not containing fertilizers or PCP, and of soils containing ammonium nitrate, superphosphate and PCP did not induce formation of toxic agents. When ammonia water containing iron carbonyl was added to the soil containing the mineral fertilizers and PCP, toxic agents were formed. It is suggested that the iron carbonyl induces acute poisoning of workers in beet fields. References: 10 Russian.

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USSR UDC 613.632.4(546.46+546.821)-07:612.017.1+616-057-02:(661.846+661.882

INDICATIONS OF NONSPECIFIC IMMUNOLOGICAL REACTIVITY AND OF MORBIDITY IN WORKERS IN A TITANIUM-MAGNESIUM ENTERPRISE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct 77 pp 29-32 manuscript received 28 Jun 76

RAKHIMOVA, M. T., Branch Institute of Regional Pathology, Ministry of Health Kazakh SSR, Ust'-Kamenogorsk

[Abstract] Chlorine, hydrogen chloride, magnesium chloride and titanium tetrachloride contaminate the working environment in Mg and Ti metallic industries. Studies described were performed on workers, at a magnesium-titanium plant, presumably in Ust'-Kamenogorsk; analyses were made of phagocytary activity of blood leucocytes. A decrease was seen in the nonspecific immunological reactivity and an increase in morbidity attributed to respiratory disorders. Findings suggested some shifts in the proteinogram of the titanium workers; pronounced shifts appeared in the A/G ratio. Blood SH-groups in the Mg and Ti workers decreased from normal. Prophylactic measures recommended include increased polyvitamin supplements in winter-spring, oil and alkali inhalation, UV in winter, and opening of a prophylactic dispensary for the workers. References: 10 Russian.

USSR

UDC 613.632:621.892.2

TOXICOLOGICAL AND HYGIENIC EVALUATION OF OMTI FIREPROOF LUBRICATING OIL

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10,  
Oct 77 pp 25-28 manuscript received 27 Dec 76

TROFIMOV, V. A., DVORKIN, E. A., NAYDENOV, V. I., TKACHUK, G. N. and  
GRAZHDANOVA, T. N., Institute of Labor Hygiene and Occupational Diseases,  
Leningrad

[Abstract] OMTI, a liquid which contains tri-3,5-xylenylphosphate is a synthetic lubricating oil for 800,000-1,200,000 kv turbines. It derives its name from the Russian language description, fire-resistant oil of the Heat Engineering Institute (K. I. Ivanov, Ye. D. Vilyanskaya). Previously developed oils of this type were found to be toxic and neuromparalytic. OMTI properties were examined at the Karmanovskiy and Lithuanian State Regional Electric Power Plants. Only insignificant levels ( $0.37 \text{ mg/m}^3$  and less) were found in the environment of these plants, the operations of which have been carefully shielded from leakage. OMTI has been shown to have low toxicity; its maximum permissible level (MPL) has been set at  $5 \text{ mg/m}^3$ . No skin protection is required against periodic contact. Industrial use is recommended. References 14: 12 Russian, 2 Western.

USSR

UDC 615.916'121.5.032

COMPARATIVE TOXICITY OF HYDROGEN PEROXIDE VAPORS UNDER INHALATION AND ACTION ON SKIN

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10,  
Oct 77 pp 22-25 manuscript received 26 Oct 76

KONDRASHOV, V. A., Moscow

[Abstract] The maximum permissible level (MPL) of vapors of hydrogen peroxides (HP) in industrial environments has not been fully decided in the USSR. Studies (contributory to this subject) are described of exposure of adult rats to HP on the fur of the trunk and extremities, and to vapors in a chamber devised in cooperation with the Kazan design bureau of Medfizpribor. Tests were also done on human volunteers. Over 50 methods of analysis of the HP effects were done, integral, hematological, biochemical, pathomorphological and histoenzymological. For single, short-term exposure to HP, the inhalation mode represents the most toxic, as opposed to the skin action; this difference tends to decrease when long-term exposure is involved. The MPL recommended for HP vapors in industrial sites is  $0.3 \text{ mg/m}^3$ . Danger of skin action is stressed. References 17: 15 Russian, 2 Western.

USSR

UDC 613.632.4+615.916):546.265.1

PREVALENCE AND CLINICAL COURSE OF CHRONIC INTOXICATION BY CARBON DISULFIDE  
UNDER VARIOUS CONCENTRATIONS OF THAT SUBSTANCE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 10, Oct  
77 pp 17-21 manuscript received 30 Dec 76

TERESHCHENKO, YU. A., TARLOV, YE. L., DEREVYANKIN, YU. S., TIMOFEYEVA, L. N.,  
ROMANOVA, V. YA. and KHARLAMOVA, G. V., Medical Institute, Krasnoyarsk

[Abstract] Recent studies have led to the establishment of 1 mg/m<sup>3</sup> as the maximum permissible level (MPL) for CS<sub>2</sub> in industrial environments. Plant improvements have brought on greater exposure to CS<sub>2</sub> and the present article examines the extent and features of chronic exposure of man to various levels of concentration. Workers examined were employed in production of cord fabric and silk, involving exposure to carbon disulfide. Clinical examinations were made by an internist and neuropathologist; additional tests included EKG, plasma adrenaline and noradrenaline, and erythrocyte lipoprotein. Exposure to 10 mg/m<sup>3</sup> and above caused development of chronic intoxication, involving neurogenic functional and metabolic changes in the myocardium, increased activity of the sympathetic-adrenal system, and decreased lipoprotein; chronic intoxication was less at concentrations of 10 mg and below. The problem was more severe in workers engaged on the job for longer periods. Lowering of the MPL is advocated. References:  
9 Russian.

USSR

UDC 619:616.992.28+085.7:636.98

USE OF GRISEOFULVIN IN DERMATOMYCOSIS IN DOLPHINS

Moscow VETERINARIYA in Russian No 10, Oct 77 pp 73-74

BLIZNYUK, YA. I. and DZHINCHARADZE, K. A., Georgian Department of the All-Union Scientific Research Institute of Sea Fisheries and Oceanography

[Abstract] Although dolphins are subject to skin diseases, little is found in the literature on therapy and prophylaxis of such diseases in these mammals. This article presents the history of infection of a *Tursiops truncatus ponticus* species in the Batumi dolphin colony in 1974; a new specimen already affected with dermatomycosis apparently was the source of contraction of the disease in four other permanent animals. The infection resembled dermatomycoses of land animals. Newly arrived wild dolphins also contracted the disorder which was traced to a fungus of the trycho-phyton family. Administration of griseofulvin (0.0375 g) three times per day for 3 weeks proved effective therapy. Figures 3.



USSR

UDC 575.224.46

ROLE OF PLASMIDS IN ASSURING THE CAPABILITY OF SALMONELLA FOR UV AND 4NQO-INDUCED MUTABILITY

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 236, No 2, 1977  
pp 460-463 manuscript received 10 May 77

SKAVRONSKAYA, A. G., ANDREYEVA, I. V., KONDRAT'YEV, YU. S., ALESHKIN, G. I.,  
ABDUKHALYKOVA, G. F., BRUKHANSKIY, G. F., TIGANOVA, I. G., STEPANOVA, N. F.  
and DEMKIN, V. V., Institute of Epidemiology and Microbiology imeni  
N. G. Gamaleya Academy of Medical Sciences USSR, Moscow

[Abstract] The dose dependence of the development of mutations in strains containing the plasmid colI and R (pKM101) plasmids is presented. It is demonstrated that these plasmids give salmonella not sensitive to the mutagenic effect of UV light and 4NQO(4-nitroquinolin oxide) the capability of formation of mutations under the influence of these agents, which is very significant from the standpoint of determination of the mechanisms of bacterial mutagenesis. The suggestion made can be experimentally tested, which is currently in process in the authors' laboratory. Figures 2; references: 9 Western.

USSR

UDC 576.851.48/.49.095.57

INFLUENCE OF LACTOBACTERIA METABOLITES UPON THE TRANSMISSION OF R-PLASMIDES IN ENTEROBACTERIA IN VITRO

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII in Russian No 8,  
Aug 77 pp 69-73 manuscript received 29 Dec 76

TALLMEYSTER, E. T., LENTSNER, KH. P. and LENTSNER, A. A., Tartu University

[Abstract] The intensive propagation of enterobacteria strains with factors of transmissive resistance to medicinal substances requires that means be sought for suppression of the transmission process of these elements among enterobacteria. The indicated study deals with the influence of metabolites of the lactobacteria contained in bacterial preparations, based on live lactobacteria, in the prevention and treatment of intestinal dysbioses, upon R-plasmide transmission and elimination processes among enterobacteria. It is found that metabolites of strains L. plantarum 8R-A3 and L. fermentum 90T-S4, used in the production of dry lactobacterin, decrease the transmission frequency of R-plasmides among enterobacteria in vitro, whereas metabolites of 8R-A3 in vitro increase the elimination frequency of R-plasmides among enterobacteria. References 13: 8 Russian, 5 Western.

USSR

UDC 576.851.48.095.57

INFLUENCE OF SPHEROPLAST FORMATION AND OF SUBSEQUENT REVERSIONS ON THE VIRULENCE AND OTHER BIOLOGICAL SIGNS OF E. COLI 0124:K72(B17)

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 77 pp 7-11 manuscript received 24 Jan 77

FEDOROVA, Z. F., First Leningrad Medical Institute imeni Academician I. P. Pavlov

[Abstract] Experimental data show that spheroplast formation by E. coli 0124 brings about the appearance of mucous versions of this organism, which seem to constitute a long-term modification induced by penicillin. Formation of the mucous substance facilitates conservation or partial restoration of the virulent properties of the bacteria. The mucous substance suppresses to a considerable extent the OB-agglutinability of E. coli 0124, thereby hindering its identification. References 13: 8 Russian, 5 Western.

USSR

UDC 576.851.47.01:551.48(479.24)

BIOLOGICAL CHARACTERISTICS OF PROTEUS STRAINS ISOLATED FROM WATER SOURCES IN THE AZERBAIDZHAN SSR

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII in Russian No 8, Aug 77 pp 41-45 manuscript received 10 Jan 77

AKHUNDOV, V. YU., AGAYEVA, R. A., AKHUNDOV, K. F., and BABARINOVA, L. N., Azerbaydzhan Scientific Research Institute of Virology, Microbiology and Hygiene imeni Musabekov, Baku

[Abstract] An investigation of open water bodies in the Azerbaydzhan SSR has yielded Proteus bacteria with the greatest constancy from the water of irrigation canals and impounds. On the basis of the signs of indol formation and maltose fermentation, about one half of the strains pertained to Pr. mirabilis, and approximately 12% to Pr. vulgaris; about 42% of the cultures deviated from these biological types. Strains of 10 serotypes belonging to serologic groups 03, 05, 013, 023 and 030, ascertained in a study of the serological characteristics, have been detected also during human intestinal disturbances. All the cultures were polyresistant and nonbacteriocinogenic; most of them were sensitive to a wide colicine spectrum. One strain manifested the capability of exerting cytopathogenic action on chicken-fibroblast tissue culture. References 26: 16 Russian, 3 Romanian, 4 Bulgarian, 2 Czech, 1 Western.

## PATHOLOGICAL ANATOMY OF EXPERIMENTAL DISEASE INDUCED IN SMALL LABORATORY ANIMALS BY THE EMC-70 STRAIN OF THE ENCEPHALOMYOCARDITIS VIRUS

Moscow BYULLETEN' ELSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9, Sep 77 pp 368-372 manuscript received 9 Mar 77

KRYLOVA, R. I., BALAYEVA, YE. YA., VOSKANYAN, N. A., DZHIKIDZE, E. K., and SHEVTSOVA, Z. V., Institute of Experimental Pathology and Therapy, Academy of Medical Sciences USSR, Sukhumi

[Abstract] In a morphological investigation of the pathological anatomy of an experimental disease brought about in small laboratory animals by a new encephalomyocarditis virus strain isolated from sick monkeys at the Sukhumi nursery, it is found that irrespective of the mode of virus injection, the newborn and juvenile mice developed some lesions in the brown fat, transverse striated muscles, as well as in the brain and heart. In guinea pigs the changes were characterized by the development of severe myocarditis and encephalitis accompanied by viral antigen accumulation. The disease induced by the EMC-70 strain could not be differentiated from the Coxsackie infection by the pathomorphological data. This fact should be taken into consideration in solving some problems pertinent to pathoanatomical diagnosis of viral disease. Figures 3; references 13: 5 Russian, 8 Western. (Figure 2 is missing).

USSR

UDC 616.988.6-092:577.2

MOLECULAR MECHANISMS IN INTERACTION OF ONCOGENIC VIRUSES WITH CELLS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 59-64

ZHDANOV, V. M., and AL'TSHTEIN, A. D., Institute of Virology imeni  
D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

[Abstract] Examination was made of provirus DNA in cells of spleen from mice--healthy or afflicted with Rausher's leukemia--and also in rat and mice cells transformed by Rous sarcoma virus (RSV). Contact of virus specific DNA in spleen, placenta and embryo in Balb C strain of mice was in equal amounts. In spleen tissue from mice with leukemia, virus specific DNA was twice as much. Virus specific RNA was present in the cells of healthy mice, with a slightly higher concentration in embryo and placenta than in the spleen. With Rausher's leukemia the concentration of virus specific RNA increased 10 times. The sharp increase in provirus reflects the productive character of the infection in transformed cells. In cells transformed by RSV, formation of the infectious virus doesn't occur. Normal cells of mammals lack the provirus for RSV. In transformed cells the provirus does develop. Content of virus specific RNA is low (0.01% of all cell RNA). Three cell lines differ for provirus DNA; cells of XC contain the complete provirus, but lines TWERC and RVP<sub>3</sub> contain the incomplete provirus. Figures 3; references 7: 2 Russian, 1 Czech, 4 Western.

USSR

UDC 547.963.32

TWO SIMPLE METHODS FOR ISOLATION OF DNA FROM VARIOUS SOURCES USING  
CETAVLON

Moscow BIOKHIMIYA in Russian Vol 42, No 10, Oct 77 pp 1783-1790 manuscript  
received 24 Jan 77

NAKTINIS, V. I., MALEYEVA, N. YE., SAN'KO, D. F. and MIRZABEKHOV, A. O.,  
Institute of Molecular Biology, Academy of Sciences USSR, Moscow

[Abstract] Cetavlon (cetyltrimethylammonium bromide) was used in the isolation of DNA from various sources. Cetavlon is a strong cationic detergent capable of lysing cells and dissociating nucleoprotein complexes, and dissolving proteins, nucleic acids and other cellular components. As a detergent, cetavlon inhibits enzymatic activity, including that of the nucleases. A mixture of 1% cetavlon, 2 M NaCl, 5 M urea and 0.1 M EDTA exhibits a strong lysing activity which, at 50°, breaks down the cellular membrane of E. coli and tetrachimena. Two methods were used for the quantitative separation of DNA from RNA. In the first, after removal of

the major portion of proteins by deproteinization with chloroform, DNA was precipitated as a CTA salt by direct dilution of the lysate to a NaCl concentration of 0.5 M. In the second method, after cell lysis and removal of cell debris by centrifugation, DNA was purified on a hydroxyapatite column. From various sources, both of these methods yield 80% DNA (average molecular weight  $20 \times 10^6$ ) without using ribonuclease, pronase or amylase. The first method gives higher yields, the second is much simpler. Both methods require about 4-6 hours to isolate DNA from 1-5 g of cells. Figures 3; references 23: 3 Russian, 20 Western.

USSR

DIOXIDINE, A NEW ANTIBACTERIAL DRUG FOR TREATMENT OF PURULENT INFECTION

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 8, 1977, submitted 30 Mar 77 pp 139-146 manuscript received 24 Jul 77

PADEYSKAYA, YE. N., PERSHIN, G. N., KOSTYUCHENOK, B. M., BLATUN, L. A., KULIKOV, YU. S., TAGIROV, R. F., GROMOV, M. V., PERSHIN, G. G., and MAKARENKOVA, R. V., All-Union Scientific Research Chemical Pharmaceutical Institute imeni Ordzhonikidze; Institute of Surgery imeni Vishnevskiy, Academy of Medical Sciences USSR; Central Military Hospital, Ministry of Internal Affairs USSR; Department of Traumatology, Orthopedics and Military Field Surgery of the Second Moscow Medical Institute imeni N. I. Pirigov, Moscow

[Abstract] Results of experimental and clinical study of the new antibacterial drug dioxidine (1,4-di-N-oxide of 2,3-bis (oxymethyl) quinoxalone) indicated that dioxidine provides a good chemotherapeutic effect in treatment of experimental bacterial infections caused by infectious agents of purulent processes. Treatment of purulent infection in man demonstrated the effectiveness of the new drug when administered intravenously or applied locally. A 0.1-1 percent aqueous solution of dioxidine, in combination with necessary surgical procedures involving 130 persons, resulted in improvement of 115 of them after other antibacterial drugs had proven ineffective. There is a possibility of side effects (nausea, vomiting, chills) in approximately 10 percent of cases involving intravenous use of dioxidine. The appearance of side effects was reduced by fractional intravenous injection 2-4 times per day by slow infusion and by the use of desensitizing treatment. Local application and injection into the pleural cavity (even in doses of 700 mg per injection) produced no side effects. References: 9 Russian.

USSR

UDC 616-006-092:615.277.3"pyrogenal+cyclophosphane"

EFFECT OF THE COMBINED USE OF PYROGENAL AND CYCLOPHOSPHANE ON EXPERIMENTAL TUMORS

Moscow VOPROSY ONKOLOGII in Russian Vol 23, No 10, 1977 pp 90-92

KOLOSOV, A. I. and KRUPKIN, R. G., Experimental Therapy Laboratory, Order of the Banner of Red Labor Scientific Research Institute of Oncology imeni N. N. Petrov, Ministry of Health USSR

[Abstract] The combination use of pyrogenal with cyclophosphane was studied in 250 white mice with transplanted sarcoma 32 or Ehrlich's carcinoma tumors. Pyrogenal increased the inhibition of tumor growth by cyclophosphane

from 83.1% to 97.8% in sarcoma and 84% to 89.2% in carcinoma when two doses of 100 mg of cyclophosphane were used, but not when the second dose was 200 mg. The survival rate of the animals was greatly increased, due to the reduction of the toxic effects of cyclophosphane by pyrogenal. Pyrogenal-induced hyperthermia causes tumor cells to divide faster and thus increases cyclophosphane selectivity. References 7: 6 Russian, 1 Western.

USSR

UDC 616-006.6-092:618.36-008.6

#### TRANSPLACENTAL CARCINOGENESIS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 14-19

NAPALKOV, N. P., Institute of Oncology imeni N. N. Petrov, Ministry of Health USSR, Leningrad

[Abstract] The author reviews the literature on carcinogen transfer from parent to fetus through the placenta. Application of the theory of critical periods of embryonic development led to recognition of specific reaction stages in embryogenesis to action of chemical carcinogens. The maternal body apparently has an ability to alleviate the effect of the carcinogens by means of metabolic detoxification. An introduction of small doses of carcinogenic substance into the mother results in sharply decreasing the effects of a regular dose on the offspring. The possibility of using the defense function of the mother is seen as an opportunity to develop methods of prophylaxis. It has been established experimentally that simultaneous introduction of some chemicals can suppress the toxic effects of a carcinogen. In recent years new research indicates that defects in development don't result in tumor growth, and that cancer may be an independent consequence of one etiological factor. The findings of combined cancer research may define criteria to indicate persons with a high risk of tumor development, and appropriate prophylactic measures may be taken. References 39:  
20 Russian, 19 Western.

USSR

UDC 615.277.3.079:[575+576.8

GENETIC AND MICROBIOLOGICAL FACTORS IN THE CONTROL OF CARCINOGENS IN  
LABORATORY ANIMALS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 75-76

DUSHKIN, V. A. and MALASHENKO, A. M., Research Laboratory of Experimental  
Biological Models, Academy of Medical Sciences USSR, Moscow Oblast

[Abstract] Experimental animals are used to test chemical products possessing mutagenic and carcinogenic properties. Mice highly susceptible to cancer are used. Besides studying separate genes, researchers are examining enzymes which participate in the metabolism of carcinogens; genetic factors bringing about this process are sought. The role of reparative cell systems in the connection between carcinogenesis and mutagenesis is also being examined. Aside from genetic susceptibility, the condition of microflora of the body is important in determining the character of carcinogenesis. For example, mice without bacteria, when exposed to radiation, developed tumors 1½ times smaller than ordinary mice. The authors conclude that animals with known sensitivity to tumor formation and which have a controlled microflora are preferable for studies of carcinogens. References 12: 5 Russian, 7 Western.

USSR

UDC 615.277.4

"PRECARCINOGENIC" COMPOUNDS (PROBLEM OF ACTIVATION WITH ACCELERATED  
TESTING)

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 80-82

BELITSKIY, G. A., KHOVANOVA, YE. M. and LOGVINENKO, YE. G., Oncological  
Scientific Center, Academy of Medical Sciences USSR, Moscow

[Abstract] A discussion is presented of chemical compounds possessing carcinogenic qualities only after metabolic transformations in the cell (the compounds include polycyclic hydrocarbons, carcinogenic azo compounds, and others), and their application in express tests where organisms lacking a complex metabolic activation are used, such as Drosophila. Mosaic experiments showed that D. melanogaster was effective in selection of carcinogenic N-nitroso compounds according to their ability to induce somatic mutations. The precarcinogens, requiring activation of cell enzymes, exhibited high carcinogenic ability. Apparently the method of researching mutagenic qualities of carcinogens in somatic tissue of Drosophila possesses high resolution in comparison to inducing mutation in gametes. A comprehensive program of research on metabolism of the basic precarcinogens



in man (using, for example, tissue culture) is recommended. References 7: 2 Russian, 5 Western.

USSR

UDC 616-006.6-02:615.277.4]-092.001.33

MODIFYING FACTORS WITH CHEMICAL CARCINOGENESIS--EFFORTS IN CLASSIFICATION

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 47-54

BOGOVSKIY, P. A., Institute of Experimental and Clinical Medicine, Ministry of Health, Estonian SSR, Tallin

[Abstract] Modifying factors (MF) in the genesis of malignant tumors are evident in experimental data and clinical observations. For example, frequency of skin cancer in workers exposed to coal tar is directly related to length of job service. MF may be cancer inhibiting or contributing to tumor development. The proposed classification, far from being complete, may be a systematic approach for experimental oncology and cancer epidemiology. MF are listed according to the following divisions: (1) MF influencing infiltration of carcinogen or its precursors into the cell; (2) MF influencing the formation of carcinogens from precursors and the formation of precursors in the organism; (3) MF influencing the withdrawal of carcinogen; (4) MF influencing metabolic activation or inactivation of carcinogen; (5) MF influencing the interaction of carcinogen with hereditary cell structures and reparation of DNA; (6) MF influencing tumor progress. Within each list, MF are divided into cancer inhibiting or contributing to tumor development, and the associated references are cited in tables. References 73: 18 Russian, 55 Western.

USSR

UDC 616-006.04-085.355:577.152.34.042

PROTEINASES AND CHEMOTHERAPY OF MALIGNANT TUMORS IN MAN

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 24-29

OREKHOVICH, V. N., ABAKUMOVA, O. YU., KAZAKOVA, O. V. and LERMAN, M. I.,  
Institute of Biological Medical Chemistry, Academy of Medical Sciences  
USSR, Moscow

[Abstract] Inhibitors of cell proteinases play a crucial role in chemotherapy of malignant tumors. Research is reported regarding group D cathepsins from normal and cancerous cells, and also features of the regulation of biosynthesis and disintegration of macromolecules in cancerous tissue. Cathepsins from rat sarcoma cells become inactive in nitrous acid

treatment, whereas rat liver cathepsins do not. Studying the action of the cathepsins on synthetic peptides, the researchers found that they differ in substrate specificity. Further tests showed that tumor cells possess increased proteinase activity, and the proteinases stimulate uncontrolled cell division. Cells from experimental tumors destroyed fewer alkylation damaged molecules of RNA, proteins and lipids, than normal host cells. A lengthy restriction of protein biosynthesis, arrested growth, and destruction of tumor cells resulted. The authors propose that their findings are related to the fact that cells are acutely sensitive to alkylating compounds, nitrosourea and ionizing radiation. Enzyme inhibitors can increase the action of the above mentioned measures. Figures 4.

USSR

UDC 615.277.4

#### DEVELOPMENT OF CONCEPTS REGARDING CHEMICAL CARCINOGENS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, 1977  
pp 11-14

SHABAD, L. M., Oncological Scientific Center, Academy of Medical Sciences,  
USSR, Moscow

[Abstract] The theories of chemical carcinogens are reviewed, from the first observations of tumors occurring in man due to exposure to chemical substances to the present day. The discovery of pure carcinogens as polycyclic aromatic hydrocarbons (1932) was important in establishing specificity. The next 20 years revealed carcinogenic action of many nitroso amines and other substances. The emergence of carcinogenic substances such as kynurenine, anthranilic acid, tryptophan derivatives, and others were found in humans and laboratory animals. Recently carcinogenic nitroso amines were found to arise from nitrates, nitrites and secondary amines from food and drugs. Air pollutants from industrial burning and cigarettes also contribute to the list of carcinogens. The phenomena of transmitting tumor formation to offspring and the occupational hazards of aniline dyes are noted. Efforts are being made to analyse the changes in DNA and synthesis of protein. The necessity for improving the environment is emphasized. Maximum permissible levels of hydrocarbons in air have been set by the Ministry of Health.

## MEDIATED ACTION OF ANTITUMORAL DRUGS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10,  
1977 pp 70-74

CHERNOV, V. A.

[Abstract] The author examines the interrelationship of drug, tumor and body. The drug brings about changes which may involve different mechanisms, and may have contradictory effects. The body responds to the drug directly and indirectly. The antitumoral effect is an integrated result of various actions. Four types of related experimental material exist: (1) It was shown with radioisotopes that certain drugs reach all endocrine organs and their cells. (2) The endocrine system is very sensitive to cytostatic substances and quickly relates to them. Function and structure may be altered. (3) The dependence of tumor development on endocrine organ condition has been established. (4) The connection between condition of endocrine glands and antitumoral and generally toxic action has been established. Decreasing tumor growth is a result of a drug's cytotoxic action on the tumor, influenced by the tumor process through the anterior hypophysis and thyroid gland, and other systems. The effect of mediated routes of cytostatic preparations on tumors is evident. It is assumed that other systems besides the endocrine play a part in these processes. New methods of combined therapy should be developed in accordance with these findings. Figures 5; references 15: 14 Russian, 1 Western.

USSR

UDC 612.178.2:612.172.4

CHANGES OF THE BIOELECTRICAL ACTIVITY OF THE PACEMAKER CELLS OF A  
DESYMPATHIZED AND RESERPINIZED FROG HEART UNDER CONDITIONS OF PARASYM-  
PATHETIC ACCELERATION

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9,  
Sep 77 pp 268-271 manuscript received 17 Mar 77

BOCHKINA, G. I., SUKHOVA, G. S. and UDEL'NOV, M. G., Department of Human  
and Animal Physiology (Head--Prof. B. A. Kudryashov) of the Biological  
Faculty, Moscow State University imeni M. V. Lomonosov, Moscow

[Text] [English abstract provided by the source] A study was made of the  
mechanism of parasympathetic acceleration on *Rana temporaria* hearts with  
the preliminarily exhausted catecholamine stores due to desympathization  
and reserpination of the animals. Bioelectrical activity of the cells  
of the isolated pacemaker was recorded. Parasympathetic acceleration was  
accompanied by an increase in the rate of accretion of slow diastolic  
depolarization (this indicating an active mechanism of this acceleration),  
and also a slight hyperpolarization and a decrease of the action potential  
duration. The acceleration effect and the changes in the form of the action  
potential were absent after atropine treatment of the preparation, this  
confirming the cholinergic nature of the parasympathetic acceleration. It  
is supposed that the parasympathetic mediator--acetylcholine--could decrease  
potassium or increase sodium permeability of the pacemaker cell membrane,  
this leading to increase of the slow diastolic depolarization rate and to  
discharge acceleration. Figures 2; references 13: 4 Russian, 9 Western.

USE OF GROWTH REGULATORS FOR INCREASING THE RESISTANCE OF SPRING BARLEY TO LODGING

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 24, No 5, Sep/Oct 77 pp 1078-1084

BOKAREV, K. S., PRUSAKOVA, L. D., MURAV'YEV, S. A. (the latter is with the Institute of Soil Science and Agricultural Economics, Latvian SSR, Skriveri) and CHIZHOVA, S. I., Institute of Plant Physiology imeni K. A. Timiryazev, Academy of Sciences USSR, Moscow

[Abstract] A study has been made (1970-1976) to develop new plant retardants for spring barley and to perfect methods for their use to increase barley resistance to lodging. Agents used included 2-chloroethylphosphonic acid (CEP), cyclohexylammonium 2,4-chlorophenoxy-alpha-isobutyrate (antiauxin II), potassium 2,3,5-triiodobenzoate (antiauxin III), dimethyl-beta-bromoethylsulfonium bromide (BES)--all prepared at the Institute of Plant Physiology--N,N-dimethylmorpholine chloride (CDM), made by the German firm BASF, trimethyl-beta-chloroethyl ammonium chloride (Kemerovo Nitrogen Fertilizer Factory) and chlorocholine chloride (CCC). Structural formulas of these products are illustrated. Barley sorts used included Viner and Moskovskiy 121; in Skriveri, field trials, Stendes and Mayya barleys (nonresistant to lodging) and Dana and Kombayner (resistant). The new agent BES, and mixtures of retardants with antiauxins II-or III were equal to or even exceeded the non-Soviet CEP (etrel) and CDM in producing resistance to lodging. It is believed that any substance which produces ethylene in plants and increases its biosynthesis--known antiauxins and some plant defoliants--can serve as an antiauxin with CCC. Figures 2; references 24: 15 Russian, 9 Western.

Radiobiology

USSR

UDC 615.849.114-036.8.015.44:612.6.03.014.482

RELATIVE BIOLOGICAL EFFECTIVENESS OF DENSELY IONIZING RADIATIONS AND THE RECOVERY OF CELLS

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 10, 1977 pp 8-12

PETIN, V. G., Scientific Research Institute of Medical Radiology, Academy of Medical Sciences USSR, Obrinsk

[Abstract] A study of the possible role of post-radiation recovery in the change of the relative biological effectiveness of  $^{239}\text{Pt}$  alpha-particles with yeast-like cells being used as the simplest model of eukariotic cells indicated that alpha-particle irradiation is much more effective than gamma-irradiation, with reduction of the survival rate of cells to the same degree requiring a 3-fold greater dose after gamma-irradiation than after the effect of alpha particles. Cells were restored after both types of irradiation and the recovery rate did not depend upon the quality of irradiation, but the proportion of cells with irreparable damage was much higher after gamma-irradiation. The rate of recovery from lethal radiation injuries did not depend upon the linear loss of energy of radiation but there was a significant increase of the proportion of irreversibly damaged cells which were not restored by reparation systems because of the severe radiation injuries caused by radiations with high linear loss of energy. The findings were illustrated by 3 examples. The data of the study indicated that one of the causes of increase of relative biological effectiveness of densely ionizing radiations is the formation of a large proportion of "severe injuries" which are not repaired by biochemical restoration systems. Figures 5; references 12: 7 Russian, 5 Western.

USSR

UDC 615.849.12.015.44:582.282.195.23

EFFECT OF NEUTRONS ON YEAST-LIKE CELLS: RELATIVE BIOLOGICAL EFFECTIVENESS AND POSTRADIATION RESTORATION

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 10, 1977 pp 12-15

KABAKOVA, N. M., FARNAKEYEV, V. V. and VIDENSKIY, V. G., Scientific Research Institute of Medical Radiology, Academy of Medical Sciences USSR, Obrinsk

[Abstract] Relative biological effectiveness was studied with the use of yeast-like cells: haploids *Zigosaccharomyces bailii* and 211-16 strain from the homozygote series and the diploid *Saccharomyces ellipsoideus* strain Megri-139B. Cell suspensions were irradiated by gamma-rays on the "Luch-2" (dose of 335 rad/min) and the neutron source was the B-3 channel

of the BR-10 research reactor (dose 350 rad/min). Post radiation restoration was determined after incubating the irradiated cellular suspension at 30° and periodic sowing of cells on a nutrient broth. The relative biological effectiveness of fast neutrons from the B-3 channel of the BR-10 reactor was 2.5 for haploid yeast-like cells and 22.2 for diploid yeast-like cells. Diploid yeast-like cells irradiated by neutrons were restored from lethal-strength injuries with the same effectiveness as that resulting from gamma-ray irradiation. Figures 5; references 12: 9 Russian, 3 Western.

USSR

UDC 615.849.12.036.8:616-006-08

STUDY OF THE RELATIVE BIOLOGICAL EFFECTIVENESS OF FAST NEUTRONS IN TUMOR CELLS

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 10, 1977 pp 20-24

ALEKSANDROV, S. N., MERKLE, K. and YAGUNOV, A. S., Central Scientific Research Roentgen-Radiological Institute, Ministry of Health USSR, Leningrad

[Abstract] Relative biological effectiveness of fast neutrons according to quantitative biophysical indicators in tumor cells (Ehrlich's carcinoma, ascitic version) was determined by comparison of doses of gamma radiation and neutron radiation which caused uniform biological effect. Indicators tested were: intensity of ultra-violet fluorescence and inhibition of mitotic activity. The neutron source was a  $^9\text{Be}_4(d, n)^{10}\text{B}_5$  reaction produced on a U-120 cyclotron. Average energy of neutrons was 6.2 MeV; dose of 40 rad/min. Source of gamma-radiation was a T-80 "Teratron." Dose rate was 90 rad/min. Increase of intensity of ultra-violet fluorescence of ascitic cells under gamma-radiation was practically linear in a dose range from 75 to 500 rads. Further increase of dosage left fluorescence virtually unchanged, exceeding the control level by no more than 42 percent. During neutron radiation, ultra-violet fluorescence increased linearly, beginning at a dose of 40 rads where  $\Delta I$  constitutes 5 percent up to a dose of 350 rads where it exceeds control values by 40 percent. Further dose increase caused only insignificant reduction of effect which still exceeds the control level by 30 percent in a dose range of 500 to 2000 rads. Figures 2; references: 7 Russian.

USSR

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OVERCOMING RADIORESISTANCE OF TUMORAL HYPOXIA AS A BASIC PREREQUISITE OF  
NEUTRON THERAPY

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 10, 1977 pp 43-46

YARMONENKO, S. P., Oncological Scientific Center, Academy of Medical  
Sciences USSR, Moscow

[Abstract] The relative importance in neutron therapy of three peculiarities of biological action of densely ionizing radiation (the levelling of differences in radio sensitivity of individual stages of the cell cycle; the more pronounced repression of post-radiation reparation processes and less dependence of the effect of the injury on the oxygen level) was discussed. Utilization of the first named advantage of neutrons requires relatively large doses of radiation and utilization of the second requires relative low doses and this prevents simultaneous use of their qualities. The use of both these peculiarities of cellular interaction of neutrons would require a knowledge of the quantitative cytokinetic parameters of specific tumors and critical tissues which is not yet available but these advantages still indicate the benefit of the use of neutrons over quantum forms of radiation. A detailed discussion of the third peculiarity confirms the great importance of overcoming tumoral hypoxia as a component of neutron therapy. Therefore the selection of appropriate tumors or stages of their development characterized by poor blood supply is important in assuring success in the use of neutrons. During this poor dose distribution and properties which may lead to over-irradiation of normal tissues may be partially compensated by the combined use of neutrons and thinly-ionizing forms of radiation in periods when reoxygenation of the tumor occurs and also by the use of radio-modifying agents for selective protection of normal tissues and for additional affection of hypoxic cells. Figures 2; references: 5 Western.

USSR

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PROSPECTS OF USE OF FAST NEUTRONS IN RADIOTHERAPY OF MALIGNANT TUMORS

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 10, 1977 pp 47-49

RUDERMAN, A. I. and MAKAROVA, G. V., Oncological Scientific Center,  
Academy of Medical Sciences USSR, Moscow

[Abstract] The struggle against malignant neoplasms has been hampered by the limitations of radiation therapy using conventional forms of radiation but modern nuclear physics is developing new methods of radiation therapy using protons, deuterons and alpha particles. Another promising alternative



is the use of fast neutrons. In 1977, the world literature described almost 2000 persons who have benefited from fast neutron therapy. The purely theoretical problem of the use of fast neutrons is beginning to be established practically but fast neutron therapy is not a universal method of radiation therapy of cancer. Each form of therapy has its own indications and contra-indications. The basic advantages of fast neutrons include the low oxygen effect which suggests a possibility of overcoming radio-resistance of hypoxic tumoral cells and the lesser dependence of the degree of cell injury on the phase of the cell cycle. Recent results of random clinical tests in hammsmit of use of fast neutrons on tumors of the head and neck showed a 2-fold greater effectiveness of fast neutrons over local therapy. Another advantage of fast neutron therapy involves the fact that, due to the high linear loss of energy, the biological effect of neutrons depends less upon the dose distribution in time. The number of centers studying the possibilities of fast neutrons has increased from 5 to 1970 to 27 at present. There are several programs of joint studies of the physical and technical provision, radiobiological basis and clinical study of the use of remote controlled fast neutron therapy of malignant tumors.

## Therapy

USSR

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### INHIBITORS OF TRYPSIN-LIKE PROTEOLYTIC ENZYMES AS MEANS OF PREVENTING THE DEVELOPMENT OF SECONDARY NECROSIS IN A BURN WOUND

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9, Sep 77 pp 288-291 manuscript received 27 Jan 77

MUZYKANT, L. I., ZAYETS, T. L., DOLGINA, M. I., KOTKINA, T. I., NOSOVA, I. M., KAYEM, R. I., PANOVA, YU. M. and KEROVA, A. I., Pathomorphology Section (Head--Prof. D. S. Sarkisov), Biochemistry Laboratory (Head--Prof. A. S. Konikova), Thermal Injuries Section (Head--V. K. Sologub, doctor of medical sciences) of the Institute of Surgery imeni A. V. Vishnevskiy, Academy of Medical Sciences USSR, Moscow

[Text] [Russian abstract provided by the source] The influence of contrical--an inhibitor of proteolytic enzymes--upon the healing of an experimental burn wound among rats by means of biochemical, histological, and histochemical methods, is studied. It is shown that among animals not treated by contrical, the healing of a burn wound (a flame burn of 20% of the body surface) is accompanied by the development of a secondary necrosis and a considerable inflammatory reaction, a rise in the activity of a number of proteases and peptidases. The application of contrical prevented the development of a secondary necrosis, this being apparently linked to a decrease in the activity of tissue proteolytic enzymes. Figures 3; tables 1; references 12: 3 Russian, 1 Polish, 8 Western.

## Veterinary Medicine

USSR

UDC 619:591.464.636.4

### INFLUENCE OF AMINAZIN ON MALE PIGS

Moscow VETERINARIYA in Russian No 10, Oct 77 pp 85-86

GUNIN, A. Z. and MKRTCHYAN, Transural Scientific Research Institute of Agriculture

[Abstract] Study was made of the action of the tranquillizer, aminazin, as a diet supplement for young male pigs. Experiments were carried out on the Zavodoukovskiy farm of the Scientific Research Institute of Agriculture of the Northern Transurals. The aminazin was incorporated into the feed mix (0.05%) prior to feeding, and fed 3 times per day up to the fourth month, then twice a day. The supplement produced a weight gain of 13% after seven months of feeding; incorporation of 0.07% aminazin inhibited food intake by the pigs. Sexual activity was depressed in the 0.05% aminazin-fed group and absent in the 0.07% group. The slaughtered pigs were not affected by the aminazin except for increased fat content. The 0.05% supplement is rated as an economically profitable feeding procedure.

USSR

UDC 619.577.37:636.22/28

### EFFECT OF SOUNDS ON PRODUCTIVITY OF COWS

Moscow VETERINARIYA in Russian No 10, Oct 77 pp 92-93

MIRONOV, N. A. (Scientific Director Professor A. N. GOLIKOV) Moscow Veterinary Academy

[Abstract] The effect of sound on milk cows was studied at the Kalyayevskiy sovkhos, Medynskiy Rayon, Kaluzhskaya Oblast in July-August 1960--sic-- exposing the cows to 120 decibel noise produced by the Maiga milking machine. Examined were stomach contractions, pulse, respiration and temperature. Milk productivity and butyric acid content was lowered, apparently due to the sound. Physiological indices showed stress reaction to the sound, attributed to hypophysis-adrenal disturbance. Tests, repeated at the "Za Kommunizm" kolkhos of the Khvastovicheskiy Rayon, Kaluzhskaya Oblast, supported the finding of a negative effect of noise on milk productivity. It is suggested that the experiments be extended to identify reflex action involvement related to specific levels of noise.

USSR

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DETERMINATION OF TOXICITY OF MIXED FEEDS INFESTED WITH MICROSCOPIC FUNGI

Moscow VETERINARIYA in Russian No 10, Oct 77 pp 98-99

KURMANOV, I. A. and TALANOV, G. A., All-Union Scientific Research Institute of Veterinary Sanitation

[Abstract] Control of mycotoxicosis is an important task in animal husbandry. An attempt is reported to set up a rapid method to determine food toxicity using guppies as the test animal. Suspected foods were freed of lipids and toxic non-polar organochloro- and phosphorus compounds using acetone and hexane; mycotoxins were extracted with chloroform and fed to the fish. Details of the extraction procedure are presented. Time of death of the guppies over a 20 hr period is recorded. The method is said to be specific for mycotoxins, and to require only 30 hrs of work time.

USSR

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DIAGNOSIS OF POULTRY CONTAMINATION BY GARDONA

Moscow VETERINARIYA in Russian No 10, Oct 77 pp 101-102

KOKHTYUK, F. P. and SUKHOMLINOVA, G. K., All-Union Institute of Experimental Veterinary Sciences

[Abstract] Gardona (rabont, vinyl phosphate) is an organophosphorus pesticide. It is used, as a powder, in insecticides and acaricides, and to combat ectoparasites in poultry, and, also, for disinfection. It persists on processed materials and finds its way into the bodies of cattle and birds. Studies are reported of diagnostic procedures. Acetylcholinesterase activities were assayed on the blood of affected poultry; poison symptoms noted are CNS involvement, lack of coordination of movement, depression and loss of muscle control. Various organs are assayed chemically for gardona content. It is described as slightly toxic,  $LD_{50} = 1550 \pm 101.8$  mg/kg.

## II. BEHAVIORAL SCIENCES

### Physiological Psychology

USSR

#### DYNAMICS OF CHANGE IN FREQUENCY OF CARDIAC CONTRACTIONS IN STUDENTS AND EXAMINERS DURING EXAMINATIONS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3, No 5, Sep/Oct 77 pp 891-897 manuscript received 20 Feb 76

RYZHIKOV, G. V., POLYANTSEV, V. A., VELICHKINA, S. V. and PELIVINOV, V. A., Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, Academy of Medical Sciences USSR, Moscow

[Abstract] Available information attests the existence of stress changes in students just prior to, while, and after undergoing exams. It is difficult to carry out physiological studies during exams, because the process adds to the already tense situation. This work has overcome the difficulty in such studies. The purposeful behavior of students and, in turn, of examiners, is different and this difference is reflected in changes in their vegetative functional reactions. Recordings were made, in parallel, on examiners and students, on the EKG and, frequency of heart beat (FHB), and of voice, during fall exams at a medical college. The effect of good or bad preparation, adequacy of time to prepare responses, success or failure as reflected in grading, all play a role in shifting the parameters measured. Graphs are presented of the marked effect of exam situations on the FHB; tabulation is presented of the changes in FHB of students and their examining teachers at various periods of the exam—before, going to it, getting the exam paper, before and during oral quizzing, receiving the grade, after the exam and subsequent freedom. Reasons for the emotional stress and its physiological resolution are discussed. Figure 1; references: 16 Russian.

USSR

#### ULTRASLOW BIOELECTRIC PROCESSES OF THE HUMAN BRAIN IN MEMORY MODULATION MECHANISMS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 3, No 5, Sep/Oct 77 pp 796-807 manuscript received 28 Nov 76

ILYUKHINA, V. A., Institute of Experimental Medicine, Academy of Medical Sciences USSR, Leningrad

[Abstract] Severe chronic diseases of the brain exacerbate the difficulty of study of mechanisms for control of psychoneural memory. Evaluation of therapeutic techniques directed to the central nervous system employs psychological, conditioned reflex, biochemical and electrophysiological methods. The present work concerns the latter methods. Ultraslow bioelectric processes (MEP) of the brain yield information about mechanisms

that form brain systems to provide human mental and physical activity. A technique is described to record ultraslow fluctuations in potential differences and differing dynamics of multicellular pulse activity of neurons in parkinsonism and phantom pain. This involves insertion of silver electrodes (100 mc, 0.1-0.2 mm<sup>2</sup>) into the thalamus and into formations of the extrapyramidal and limbic systems. Positioning of the electrodes is described; the technique has been detailed in earlier reports of Ilyukhina (1972-1977). The MEP are isolated into independent classes of physiological characteristics of a link in the brain system. Certain general consistencies in the neurodynamics of the links in the system are revealed during formation of, or directed alteration in, the matrix of long-term memory. Application of electrical, neuropharmacological or word stimuli can be used to direct such changes in the matrix, and development of these changes can be traced through MEP. Figures 5; references 23: 20 Russian, 3 Western.

CSO: 1840

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